

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 Claims 1-19 (canceled).

1 20. (new) A method for establishing a desired transfer
2 characteristic which converts an acoustical input signal
3 impinging on a microphone arrangement into an electric output
4 signal as a function of the angle at which said acoustical
5 input signals impinge on said microphone arrangement, said
6 method comprising the steps of:

7 providing at said microphone arrangement a first
8 microphone sub-arrangement and a second microphone
9 sub-arrangement, each microphone sub-arrangement
10 having a transfer characteristic which converts said
11 acoustical input signal impinging on said microphone
12 sub-arrangements into an electric output signal of
13 the respective sub-arrangement, said transfer
14 characteristics of said first microphone sub-
15 arrangements being different from said transfer
16 characteristic of said second microphone sub-
17 arrangement with respect to said acoustical input
18 signal;

19 forming a ratio of said output signals of said first and
20 second microphone sub-arrangements, thereby
21 generating a ratio result;

22 forming a saturated product with said ratio result as one
23 factor, thereby clipping said product at a
24 predetermined or predetermined value and
25 generating a saturated product result; and
26 generating said electric output signal as a function of
27 said saturated product result.

1 21. (new) The method of claim 20, further comprising the
2 step of saturating said product on a maximum value.

1 22. (new) The method of claim 20, further comprising the
2 step of forming said saturated product with a second factor
3 having an arbitrary value different from 0.

1 23. (new) The method of claim 20, wherein said function
2 of said saturated product result comprises a difference
3 function of a constant value and said saturated product
4 result.

1 24. (new) The method of claim 23, wherein said constant
2 value is selected to be adjustable.

1 25. (new) The method of claim 23, further comprising the
2 step of saturating said saturated product on a saturation
3 value and selecting said constant to be at least substantially
4 equal with said saturation value.

1 26. (new) The method of claim 20, further comprising the
2 step of forming said ratio from the amplitude values of said
3 output signals of said sub-arrangements.

1 27. (new) The method of claim 20, further comprising
2 generating said electric output signal according to the
3 equation:

$$4 \quad S = c_n \cdot \left\{ A - \left[\alpha \cdot \frac{|c_z|}{|c_n|} \right]_{satB} \right\}$$

5 wherein:

6 S is said electric output signal,

7 A is a predetermined or adjusted value,

8 $|c_n|$ is the amplitude value of the output signal of one of
9 said sub-microphone arrangements, the transfer
10 characteristic of which has maximum gain for a value
11 of said angle at which said desired transfer
12 characteristic shall have maximum gain as well,
13 $|c_z|$ is the amplitude value of the other of said at least
14 two sub-microphone arrangements,
15 **satB** is the saturation of the product [] to a
16 predetermined or adjusted minimum or maximum value
17 **B**, and
18 α is a predetermined or adjustable factor.

1 28. (new) The method of claim 20 further comprising the
2 step of selecting said transfer characteristics of said at
3 microphone sub-arrangements to have respectively a maximum
4 gain for acoustical signal impinging on substantially opposite
5 directions.

1 29. (new) The method of claim 20, further comprising
2 selecting said transfer characteristics of said microphone
3 sub-arrangements to be generally of cardioid shape in polar
4 diagram representation.

1 30. (new) The method of claim 20, further comprising
2 selecting said transfer characteristics of said microphone
3 sub-arrangements to be generally of hyper-cardioid shape in
4 polar diagram representation.

1 31. (new) The method of claim 20 for establishing a
2 desired transfer characteristic of a hearing device.

1 32. (new) The method of claim 20 for establishing a
2 desired transfer characteristic for a hearing aid device.

1 33. (new) A microphone arrangement comprising:
2 two microphone sub-arrangements each having an output,
3 each of said microphone sub-arrangements also having
4 a respective transfer characteristic with which
5 acoustical input signal impinging on said microphone
6 sub-arrangements are converted into respective
7 electrical output signals at said outputs as a
8 function of the angle at which said acoustical input
9 signals impinge on said microphone sub-arrangements,
10 said transfer characteristics of said microphone
11 sub-arrangements being different with respect to
12 said acoustical input signal;
13 a computing unit having at least two inputs and an
14 output, said outputs of said microphone sub-
15 arrangements being respectively operationally
16 connected to said inputs of said computing unit,
17 said computing unit including:
18 a ratio forming and weighing unit having an output,
19 a denominator input, a numerator input and a
20 weighing input, wherein
21 one of said inputs of said computing unit is
22 operationally connected to said denominator
23 input, and wherein
24 the other of said inputs of said computing unit is
25 operationally connected with said numerator
26 input, and further wherein
27 said ratio forming and weighing unit generates at
28 said output an output signal saturated at a
29 maximum and/or minimum value, the output of
30 said ratio forming and weighing unit being
31 operationally connected to the output of said
32 microphone arrangement.

1 34. (new) The arrangement of claim 33, wherein the output
2 signal of said ratio forming and weighing unit is saturated on
3 a maximum signal value.

1 35. (new) The arrangement of claim 33, wherein said
2 weighing input of said ratio forming and weighing unit is set
3 with a signal representing a weighing factor different from
4 zero which is predetermined or adjustable.

1 36. (new) The arrangement of claim 33, wherein the output
2 of said ratio forming and weighing unit is operationally
3 connected to said output of said computing unit via a
4 difference forming unit.

1 37. (new) The arrangement of claim 36, wherein said
2 difference forming unit has a first input operationally
3 connected to the output of said ratio forming and weighing
4 unit and has a second input for a predetermined or adjustable
5 signal.

1 38. (new) The arrangement of claim 37, wherein the value
2 of said predetermined or adjustable signal is at least
3 substantially equal to a value at which the output signal of
4 said ratio forming and weighing unit is saturated.

1 39. (new) The arrangement of claim 33, wherein said
2 inputs of said computing unit are operationally connected
3 respectively to said denominator and numerator inputs of said
4 ratio forming and weighing unit via magnitude forming units.

1 40. (new) The arrangement of claim 33, wherein said
2 output of said ratio forming and weighing unit is
3 operationally connected to one input of a multiplication unit

4 having at least two inputs and an output, the second input of
5 said multiplication unit being operationally connected to the
6 output of the microphone sub-arrangement, the output of which
7 is operationally connected to said denominator input, said
8 output of said multiplication unit being operationally
9 connected to said output of said computing unit.

1 41. (new) The arrangement of claim 36, wherein the output
2 of said difference forming unit is operationally connected to
3 an input of a multiplication unit having two inputs and an
4 output, the second input being operationally connected to the
5 output of the microphone sub-arrangement, the output of which
6 is operationally connected to said denominator input, the
7 output of said multiplication unit being operationally
8 connected to the output of said computing unit.

1 42. (new) The arrangement of claim 33 further comprising
2 time to frequency converter units interconnected between said
3 outputs of said microphone sub-arrangements and said inputs of
4 said computing unit.

1 43. (new) The arrangement of claim 33, wherein said
2 microphone sub-arrangements have respective transfer
3 characteristics with a cardioid shape in polar representation.

1 44. (new) The arrangement of claim 33, wherein said
2 microphone sub-arrangements have respective transfer
3 characteristics with a hyper-cardioid shape in polar
4 representation.

1 45. (new) The arrangement of claim 33 being part of a
2 hearing device.

1 46. (new) The arrangement of claim 33 being part of a

2 hearing aid device.

1 47. (new) A method for establishing a desired transfer
2 characteristic which converts acoustical input signals
3 impinging on a microphone arrangement into an electric output
4 signal as a function of the angle at which said acoustical
5 input signals impinge on said microphone arrangement, said
6 method comprising the steps of:

7 providing at said microphone arrangement at least two
8 microphone sub-arrangements, each microphone sub-
9 arrangement having a transfer characteristic which
10 converts said acoustical input signals impinging on
11 said microphone sub-arrangements into an electric
12 output signal of a respective sub-arrangement, said
13 transfer characteristics of said at least two
14 microphone sub-arrangements being different;
15 forming a ratio of said output signals of said at least
16 two sub--arrangements, thereby generating a ratio
17 result;
18 forming a saturated product with said ratio result as one
19 factor, thereby performing saturating said product
20 at a predetermined or predeterminable value and
21 generating a saturated product result;
22 generating said electric output signal as a function of
23 said saturated product result.

1 48. (new) A microphone arrangement comprising:
2 a first microphone sub-arrangement having a first output
3 in the time domain having a first transfer
4 characteristic with respect to an impinging acoustic
5 signal;
6 a second microphone sub-arrangement having a second
7 output in the time domain having a second transfer

8 characteristic with respect to an impinging acoustic
9 signal, wherein
10 said first transfer characteristic and said second
11 transfer characteristic are different;
12 a first time to frequency converter unit for converting
13 said first output into a first frequency domain
14 signal;
15 a second time to frequency converter unit for converting
16 said second output into a second frequency domain
17 signal;
18 a computing unit having a first input, a second input,
19 and an output, wherein
20 said frequency domain signals of said time to frequency
21 converter units are connected to said inputs of said
22 computing unit, respectively, wherein
23 said computing unit generates a ratio signal that is
24 proportional to an amplitude or an absolute value of
25 one of said first and second frequency domain
26 signals, and further wherein
27 said ratio signal is inversely proportional to an
28 amplitude or an absolute value of the other of said
29 first and second frequency domain signals, and still
30 further wherein
31 said ratio forming and weighing unit multiplies said
32 ratio signal by a non-zero value to create a
33 weighted ratio; and wherein
34 said ratio forming and weighing unit generates a
35 saturated signal by clipping said weighted ratio at
36 a maximum and/or minimum value.

1 49. (new) The microphone arrangement of claim 48, wherein
2 said computer unit further generates a difference signal by
3 subtracting said saturated signal from a constant.

1 50. (new) The microphone arrangement of claim 49, wherein
2 said computer unit further generates an output signal by
3 multiplying said difference signal by one or the other of said
4 first and said second frequency signals.

1 51. (new) The microphone arrangement of claim 49, wherein
2 said computer unit further generates an output signal by
3 multiplying said difference signal by the other of said first
4 and second frequency domain signals.

1 52. (new) A method for establishing a desired transfer
2 characteristic which converts an acoustical input signal
3 impinging on a microphone arrangement into an electric output
4 signal as a function of the angle at which said acoustical
5 input signals impinge on said microphone arrangement, said
6 method comprising the steps of:

7 at said microphone arrangement providing:

8 a first microphone sub-arrangement having a transfer
9 characteristic which converts said acoustical
10 input signal impinging on said first microphone
11 into an output signal represented by c_n ; and

12 a second microphone sub-arrangement having a transfer
13 characteristic which converts said acoustical input
14 signal impinging on said second microphone into an
15 output signal represented by c_z ; and
16 generating said electric output signal according to the
17 equation:

$$18 \quad S = c_n \cdot \left\{ A - \left[\alpha \cdot \frac{|c_z|}{|c_n|} \right]_{satB} \right\}$$

19 wherein:

20 S is said electric output signal,

21 A is a predetermined or adjusted value,
22 $|c_n|$ is the amplitude value of the output signal c_n ,
23 $|c_z|$ is the amplitude value of the output signal c_z ,
24 satB is the saturation of the product [] to a
25 predetermined or adjusted minimum or maximum value
26 B, and
27 α is a predetermined or adjustable factor.

1 53. (new) The method of claim 52 wherein the transfer
2 characteristic of the first microphone sub-arrangement has
3 maximum gain for a value of said angle at which said desired
4 transfer characteristic shall have maximum gain as well.

1 54. (new) A microphone arrangement implementing the
2 method of claim 52.

1 55. (new) A microphone arrangement implementing the
2 method of claim 53.
